

Remarks/Arguments:

Claim Status:

Claims 1-32 are pending in the present case. The claims have not been amended, but are reproduced on the foregoing pages for the Examiner's convenience.

Claim Rejection Under 35 U.S.C. § 102(b):

Claims 25-32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Evans (U.S. Patent No. 2,658,728). Applicants respectfully traverse the rejection of these claims and respectfully submit that these claims are patentable over Evans for the reasons set forth below.

Independent claim 25 recites limitations that are neither disclosed nor suggested by Evans, namely:

“**a fitting extending into the interior of said tank**, said fitting being sealingly coupled to **said outer tube and to said wall** of said tank, ... said fitting at least partially defining a fluid flow passageway extending between said elongated passageway and an exterior of said tank...”

Evans neither discloses nor suggests a fitting sealingly coupled to an outer tube and to a wall of the tank, wherein the fitting at least partially defines a fluid flow passageway extending between an elongated passageway and an exterior of the tank. As described in Applicant's specification for purposes of illustration, and according to one exemplary embodiment of the invention:

“A **fitting 20** is connected to each end of the heat exchange tube assembly 16 and to the tank wall 14 of the water heater assembly 10. The fittings 20, along with other features of the heat exchange tube assembly 16 to be identified subsequently, are **configured to reduce movement of the heat exchange tube assembly 16 with respect to the water heater tank 12...**” (Sheet 11, Line 6); and

“Fitting assembly 20A further includes an annular shoulder surface 70A, a bore 72A configured to receive one of the end portions 46 of the outer tube 22, and an interior annular shoulder 74A. These features are configured to reduce movement of the heat exchange tube assembly 16” (Sheet 17, Line 5).

The Office Action contends that “[p]arts 7, 8, 10, and 16 of Evans can be considered to be a fitting extending into the interior of the tank (1)...” Applicant's respectfully submit that items 7 and 8 are tube sheets welded between the base of a dome-shaped member 6 and an annular shell section 1a, which tube sheets 7 and 8 (along with the shell section 1a) *define the*

boundaries of the outer channel 2. Similarly, item 10 is a tube sheet welded between the dome-shaped member 6 and an annular shell section 1b. Item 16 cited in the Office Action is a nozzle that is configured to deliver fluid into the channel 2. The nozzle 16 and tube sheets 7, 8 and 10 are not coupled to each other and are each separately coupled to the shell section 1a or 1b of the tank 1.

The separate components cited in the Office Action (i.e. tube sheets 7, 8 and 10 and nozzle 16) illustrated in Evans do not suggest the fitting claimed in Applicants' claim 25, which is a component that:

- (1) **extends into the interior of a tank;**
- (2) **is sealingly coupled to an outer tube and to a wall of the tank; and**
- (3) at least partially defines a fluid flow passageway extending between an elongated passageway and an exterior of the tank.

"The pending claims must be given their broadest reasonable interpretation *consistent with the specification.*" (*In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000)). Applicants contend that Evans' separate components, i.e. tube sheets 7, 8 and 10 and nozzle 16, which define the boundaries of an outer channel 2 and deliver fluid into the channel 2, respectively, do not suggest Applicants' fitting as it is claimed in claim 25, based on a reasonable interpretation of the term "fitting" in view of Applicants' specification and figures and the structural features of the fitting recited in claim 25. Evans therefore fails to disclose or suggest every element of Applicants' claimed invention.

Accordingly, for the foregoing reasons, Applicants respectfully submit that independent claim 25 is patentable over Evans and should be allowed. Claims 26-31 are dependent upon claim 25, and therefore should also be allowed at least as dependent upon an allowable base claim.

Independent claim 32 recites limitations that are neither disclosed nor suggested by Evans, namely step of:

"positioning the heat exchange tube in a tank having a wall defining an interior for holding water, such that **end portions of the outer tube are within the interior of the tank and end portions of the inner tube extend through the wall of the tank**"

As described in Applicant's specification for purposes of illustration, and according to exemplary embodiments of the invention:

As is illustrated in Figs. 8A - 10B, each of the fittings 20A, 20B, and 20C is configured **to position the end portions of the outer tube 22 such that they terminate within the interior "I" of the water heater tank 12 (i.e., inwardly from the interior surface of the wall 14 of the tank 12)**. In each of the exemplary embodiments shown in Figs. 8A - 10B, this is accomplished by providing a surface on the fitting that limits the position of the end portions of the outer tube 22 relative to the wall 14 of the tank 12. More specifically, each of the fitting assemblies 20A, 20B, and 20C provides an interior annular shoulder 74A, 74B, and 74C, respectively, which determines the location of the end portion of the outer tube 22. Each of the fitting assemblies 20A, 20B, and 20C also provides an annular shoulder surface 70A, 70B, and 70C, respectively, which determines the relative position of the fitting assembly 20A, 20B, and 20C with respect to the tank wall 14. By virtue of the relative position between the interior annular shoulder 74A, 74B, and 74C and the annular shoulder surface 70A, 70B, and 70C, respectively, **the end portions of the outer tube 22 are maintained within the interior of the tank 12.** (Sheet 19, Line 22 to Sheet 20, Line 12)

Retaining the end portions of the outer tube within the interior of the tank is particularly advantageous, whereby:

"It has been discovered that, by **positioning the ends of the outer tube 22 within the interior "I" of the tank 12**, at least one benefit is achieved. Specifically, termination of the end portions of the outer tube 22 within the tank 12 makes it possible to **reduce the space** required on the exterior of the tank 12 for the fluid flow passageway 56A, 56B, and 56C. In other words, **by forming the starting point of the fluid flow passageway 56A, 56B, and 56C within the tank's interior "I," less structure is needed on the exterior of the wall 14** of the tank 12 for the completion of the fluid flow passageway 56A, 56B, and 56C (whether by means of apertures 62A and 62B or by means of the space between the fitting coupling 78C and the remainder of fitting 20C)." (Sheet 20, Line 13)

Evans neither discloses nor suggests end portions of an outer tube that are within the interior of a tank. Applicants' respectfully disagree with Office Action's statement that Evans' tube sheet 7 is a wall of Evans' tank 1. Instead, Evans' **dome shaped member 6, dome shaped member 9 and annular shell sections 1a and 1b define the walls of Evans' shell 1.** If tube sheet 7 is erroneously considered to be a wall of shell 1, then Evans' outer channels 3 and 5 are unbounded and wholly separate from the heat exchanger. According to Evans, "complete **drainage is obtainable** from the channel 3 through the tubes 12 and the channel 5" (Column 2, Line 51). The fluid within the three inner tubes 12 is distributed into the channels 3 and 5. Thus, the channels 3 and 5 serve a purpose within the confines of the heat exchanger

shell. Also, in contrast with Applicants' claimed invention, the end portions of the inner tubes 12 illustrated in Evans **do not extend through** the wall (i.e. dome shaped member 6, dome shaped member 9 and annular shell section 1b) of the shell 1.

Accordingly, for the foregoing reasons, Applicants respectfully submit that independent claim 32 is patentable over Evans and should be allowed.

Claim Rejection Under 35 U.S.C. § 103(a):

- Claims 1-24 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Plummer (Great Britain Patent No. 804,592) in view of Evans (U.S. Patent No. 2,658,728). Applicants respectfully traverse the rejection of this claim and respectfully submit that this claim is patentable over the proposed combination of Plummer with Evans for the reasons set forth below.

First, it is important to note that there is a lack of motivation to combine Plummer and Evans. In re Rouffet, for example, the Federal Circuit held that even where the combination of references taught every element of the claimed invention (not the case here as set forth below), without a motivation to combine, a rejection based on a *prima facie* case of obviousness was improper (47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998)). The Plummer reference discloses an inner tube 2, an outer tube 4 and a strip or wire 3 sandwiched therebetween, wherein "the member [2] and strip [3] are then located within the outer member 4 and **contact is made between the members [2, 4] and the strip [3]**" (Sheet 2, Line 41) to "ensure **adequate and intimate pressure contact** between the members [2, 4] and the strip [3]" (Sheet 2, Line 59). Adequate and intimate pressure contact is maintained to transfer heat from liquid metal heating fluid to a heated fluid (refer to Sheet 2, Line 91). Accordingly, the strip 3 positioned between the inner tube 2 and the outer tube 4 is composed of a "high conductive material" (refer to Sheet 2, Line 94) to transfer heat. Thus, the **strip 3 bridges the gap between the inner tube 2 and the outer tube 4** to achieve heat transfer between the tubes.

In contrast, the Evans reference discloses an inner tube 12 positioned within an outer tube 13, wherein "the outer tubes are substantially larger than the inner tubes therein and provide **substantial space** surrounding the latter" (Column 2, Line 17). Because Plummer discloses a strip to bridge the gap between the inner and outer tubes for heat transfer purposes ("contact is made between the members [2, 4] and the strip [3]" to "ensure adequate and intimate pressure contact between the members [2, 4] and the strip [3]") and Evans proposes a

substantial separation of the inner and outer tubes ("the outer tubes are substantially larger than the inner tubes therein and provide substantial space surrounding the latter"), the references teach away from each other and, therefore, are not combinable as proposed in the Office Action.

Furthermore, modification of the Plummer reference as proposed in the Office Action is improper because it would render frustrate the purpose of Plummer's heat exchange system. Specifically, if the end portions of Plummer's inner tube 2 were positioned to extend through a wall of Plummer's tank and the end portions of Plummer's outer tube 4 were positioned within the interior of Plummer's tank, as suggested by the Office Action (Sheet 5), such modification would contradict Plummer's header configuration. More specifically, if the ends of Plummer's outer and inner tubes were *not* flush as taught in Plummer's Figure 1, inert gas from helical passage 5 would not be sealed from passage into the headers 8 (for undesired mixing with a first fluid in the headers) and/or into the body of the head exchanger (for undesired mixing with a second fluid).

The Federal Circuit has held that "if [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification" In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Because the proposed modification of Plummer would render the Plummer reference unsatisfactory for its intended purpose, *prima facie* obviousness cannot be established based on the cited references. Applicants' respectfully submit that claims 1-24 are patentable over Plummer and Evans and should be allowed.

Furthermore, even if the proposed combination of Plummer with Evans were proper for sake of argument, *prima facie* obviousness cannot be established based on the cited references, because neither reference discloses or suggests a "portion of said outer surface of said inner tube [in] contact[] [with] a portion of said inner surface of said outer tube," as recited in independent claim 1, with similar limitations found in independent claims 11-13. The Office Action contends that Plummer describes "a portion of the outer tube surface of the inner tube contacting a portion of the inner surface of the outer tube," citing Sheet 2, Line 60 of Plummer. Applicant respectfully submits that the foregoing interpretation is erroneous and actually contradicts the teaching of Plummer. Beginning on Sheet 2, Line 65, for example, Plummer describes a method of forming its heat exchanger tube 1 comprising the following steps: "the helical wall 3 is produced by drawing a metallic sheath, such as copper or aluminum, over the inner member 2" and "machining a spiral groove in the external surface of the sheath" OR

"[a]lternatively the spiral groove may be formed on the outer member 4 or the spiral may be machined in the outer surface of the member 2." There is no suggestion in Plummer to omit the important sheath 3 in any embodiment because that sheath 3 provides critical heat transfer. Rather, in Plummer's alternative embodiment, a non-machined sheath 3 is positioned between either a machined inner member 2 or a machined outer member 4. As taught by Plummer, the sheath 3 is a critical component of the tube 1 to achieve heat transfer between the inner member 2 and the outer member 4. Accordingly, because a sheath 3 is taught to be interposed between the inner member 2 and outer member 4 of Plummer, the inner and outer members can not be in direct contact, thereby failing to meet the "contact" limitation recited in Applicants' independent claims 1 and 11-13. Thus, *prima facie* obviousness cannot be established based on the cited references because neither reference, alone or in the combination proposed in the Office Action, discloses or suggests every element of Applicants' invention, as recited in claims 1-24.

- In addition to the above arguments, independent claim 11 recites limitations that are neither disclosed nor suggested by Plummer or Evans, namely a "**wall of said outer tube is thicker** than said wall of said inner tube." Applicant respectfully disagrees with the Office Action's statement that "it would have been obvious to make one thicker than the other to enable machining the thicker one to form the grooves." There is, however, no such suggestion shown in the prior art. Applicants have discovered that the relative wall thicknesses recited in independent claim 11 cover several significant benefits, for example,

"First, the fluid flowing through the inner tube 42 is often oxygen depleted and therefore can result in reduced oxidation of the inner tube 42 as compared to the oxidation of the outer tube 22 caused by the water (relatively oxygen rich) in the tank 12. Accordingly, the **outer tube 22 is likely to oxidize or corrode at a higher rate** as compared to the inner tube 42. Second, the pressure of the water in the tank 12 is likely to be greater than that of the water circulating within the inner tube 42. Accordingly, **water in the tank 12 is more likely to pass inwardly through a leak in the outer wall 49** as compared to the likelihood of water in the inner tube 42 passing outwardly through a leak in the inner wall 52." (Sheet 15, Line 11)

Accordingly, because there is no suggestion or motivation to make the proposed modification, *prima facie* obviousness cannot be established based on the cited references. The only suggestion to introduce the wall thickness limitation of independent claim 11 is found in Applicants' specification, and use of Applicants' suggestion is impermissible hindsight

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reconstruction. Applicants' respectfully submit that claim 11 is patentable over Plummer and Evans and should be allowed.

Conclusion

In view of the amendments in the claims and the remarks set forth above, Applicants respectfully submit that this application is now in condition for allowance, which action is respectfully requested.

Respectfully submitted,

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